

## 2004 Chevrolet S10 Pickup

2004 DRIVELINE/AXLES Drive Axle - Locking/Limited Slip - Blazer/S-10, Jimmy/Sonoma

### 2004 DRIVELINE/AXLES

Drive Axle - Locking/Limited Slip - Blazer/S-10, Jimmy/Sonoma

## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

#### Fastener Tightening Specifications

Application	Specification	
	Metric	English
Pinion Shaft Lock Bolt	25 N.m	19 lb ft

### THRUST BLOCK SIZES (LOCKING)

#### Thrust Block Sizes (Locking)

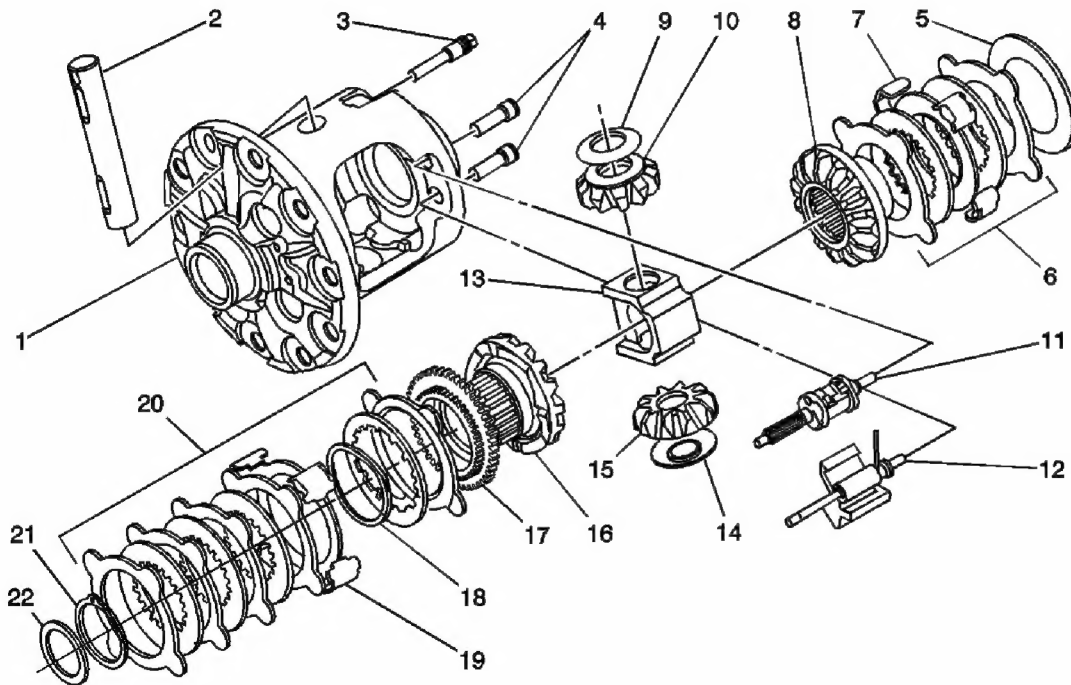
Color Code	Thrust Block Size	
	7.6" Axle	8.6" Axle
Purple	32.00 mm (1.260")	33.58 mm (1.322")
White	32.11 mm (1.264")	33.68 mm (1.326")
Brown	32.21 mm (1.268")	33.78 mm (1.330")
Yellow	32.31 mm (1.272")	33.88 mm (1.334")
Orange	32.41 mm (1.276")	33.99 mm (1.338")
Pink	32.51 mm (1.280")	34.09 mm (1.342")
Green	32.61 mm (1.284")	34.19 mm (1.346")
Blue	32.71 mm (1.288")	34.29 mm (1.350")

## COMPONENT LOCATOR

### LOCKING DIFFERENTIAL DISASSEMBLED VIEWS

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**Fig. 1: Locking Differential Disassembled View**  
Courtesy of GENERAL MOTORS CORP.

### Callouts For Fig. 1

Callout	Component Name
1	Differential Housing
2	Differential Pinion Gear Shaft
3	Differential Pinion Gear Shaft Lock Bolt
4	Locking Differential Governor and Lockout Assembly Bushings
5	Locking Differential Clutch Disc Thrust Washer
6	Locking Differential Clutch Disc Pack (5 Discs)
7	Locking Differential Clutch Disc Guide (4 Required)
8	Locking Differential Side Gear
9	Differential Pinion Gear Thrust Washer
10	Differential Pinion Gear
11	Locking Differential Governor Assembly
12	Locking Differential Latching Bracket Assembly
13	Locking Differential Thrust Block
14	Pinion Gear Thrust Washer
15	Differential Pinion Gear
16	Locking Differential Side Gear (Cam Faced)
17	Locking Differential Side Gear (Cam Plate)

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18	Wave Washer
19	Locking Differential Clutch Disc Guide (4 Required)
20	Locking Differential Clutch Disc Pack (10 Discs)
21	Snap Ring
22	Locking Differential Clutch Disc Thrust Washer

## DIAGNOSTIC INFORMATION AND PROCEDURES

### DIAGNOSTIC STARTING POINT - LOCKING/LIMITED SLIP REAR AXLE

Begin the system diagnosis by reviewing the system Description and Operation. Reviewing the Description and Operation information will help you determine the correct symptom diagnostic procedure when a malfunction exist. Reviewing the Description and Operation information will also help you determine if the condition described by the customer is normal operation. Refer to **Symptoms - Locking/Limited Slip Rear Axle** in order to identify the correct procedure for diagnosing the system and where the procedure is located.

### SYMPTOMS - LOCKING/LIMITED SLIP REAR AXLE

Review the system and operation in order to familiarize yourself with the system functions. Refer to **Locking Differential Description and Operation** .

#### Visual/Physical Inspection

- Inspect the system for the following:
  - Loose or missing fasteners
  - Obvious damage or conditions which may cause the symptom.
- Check the system for proper operation. Refer to **Locking Differential Diagnosis** .

#### Symptom List

Refer to a system diagnostic procedure from the following list in order to diagnose the symptom:

- **Locking Rear Axle Does Not Lock**
- **Locking Rear Axle Locks in Turns**
- **Locking Rear Drive Axle Chatters in Turns**
- **Noise in Addition to Normal Clutch Engagement**

### LOCKING DIFFERENTIAL DIAGNOSIS

1. Place the vehicle on a frame-contact hoist, allowing free rotation of the rear wheels.
2. Hold 1 wheel stationary. Slowly rotate the other wheel approximately 1/2 revolution

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per second in both the forward and reversed directions. The wheel should rotate freely. The differential is locking and is broken if both wheels attempt to turn together.

3. Raise the hoist to maximum height with 1 person in the vehicle.
4. Start the engine. Ensure that the engine is operating at low idle speed (warm engine).
5. Apply the service brake. Place the automatic transmission in drive. Depress the clutch and place the transmission in first gear with a manual transmission.
6. Lock 1 rear wheel by pulling one parking brake cable from under the vehicle with the aid of an assistant.
7. Release the service brakes or disengage the clutch slowly enough to start the free wheel turning. The locked rear wheel remains stationary.
8. Increase the speed of the free wheel. The differential will lock, causing the rotating wheel to stop or both wheels to turn at the same speed. The engine, if equipped with manual transmission, may stall. In order to cause the differential to lock, you may need to accelerate the engine until approximately 16 km/h (10 mph) is indicated on the vehicle speedometer. If the indicated speed can be increased beyond 32 km/h (20 mph) without causing the differential to lock, the unit is not functioning properly. Rapid release of the brakes or clutch, or rapid acceleration of the engine, will invalidate the test.
9. Lock the opposite rear wheel and repeat the procedure.

### LOCKING REAR AXLE DOES NOT LOCK

#### Locking Rear Axle Does Not Lock

Checks	Action
Little or no preload on the latching bracket	Replace the governor assembly and the latching bracket. Refer to <b><u>Locking Differential Disassemble</u></b> and <b><u>Locking Differential Assemble</u></b> .
Flyweights in the governor assembly are stuck closed	Replace the governor assembly and the latching bracket. Refer to <b><u>Locking Differential Disassemble</u></b> and <b><u>Locking Differential Assemble</u></b> .
The drive teeth on the governor or cam gear assembly are broken	Replace the cam plate, the governor assembly, and the latching bracket. Refer to the following: <ul style="list-style-type: none"><li>• <b><u>Locking Differential Disassemble</u></b></li><li>• <b><u>Locking Differential Cam Unit Disassemble</u></b></li><li>• <b><u>Locking Differential Cleaning and Inspection</u></b></li><li>• <b><u>Locking Differential Cam Unit Assemble</u></b></li><li>• <b><u>Locking Differential Adjustment</u></b></li><li>• <b><u>Locking Differential Assemble</u></b></li></ul>
Broken clutch plates	Replace the clutch plates and the wave spring. Refer to the following:

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- **Locking Differential Disassemble**
- **Locking Differential Cam Unit Disassemble**
- **Locking Differential Cleaning and Inspection**
- **Locking Differential Cam Unit Assemble**
- **Locking Differential Adjustment**
- **Locking Differential Assemble**

### LOCKING REAR AXLE LOCKS IN TURNS

#### Locking Rear Axle Locks in Turns

Checks	Action
The governor assembly is tight in the case	Free up the governor assembly. Refer to <b><u>Locking Differential Disassemble</u></b> and <b><u>Locking Differential Assemble</u></b> .
Broken or weak governor flyweight spring	Replace the governor assembly and the latching bracket. Refer to <b><u>Locking Differential Disassemble</u></b> and <b><u>Locking Differential Assemble</u></b> .
The flyweight in the governor assembly is stuck open	Replace the governor assembly and the latching bracket. Refer to <b><u>Locking Differential Disassemble</u></b> and <b><u>Locking Differential Assemble</u></b> .
The cam plate or the governor drive teeth are broken	Replace the cam plate, the governor assembly, and the latching bracket. Refer to the following: <ul style="list-style-type: none"><li>• <b><u>Locking Differential Disassemble</u></b></li><li>• <b><u>Locking Differential Cam Unit Disassemble</u></b></li><li>• <b><u>Locking Differential Cleaning and Inspection</u></b></li><li>• <b><u>Locking Differential Cam Unit Assemble</u></b></li><li>• <b><u>Locking Differential Adjustment</u></b></li><li>• <b><u>Locking Differential Assemble</u></b></li></ul>

### LOCKING REAR DRIVE AXLE CHATTERS IN TURNS

#### Locking Rear Drive Axle Chatters in Turns

Checks	Action
Lubricant is contaminated	Drain and flush the axle housing thoroughly. Refill with the correct lubricant. Refer to <b><u>Lubricant Replacement - Rear Drive Axle</u></b> in Rear Drive Axle.
The clutch plates are deteriorated	Replace the clutch plates. Refer to <b><u>Locking Differential Cam Unit Disassemble</u></b> and <b><u>Locking Differential Cam Unit Assemble</u></b> .

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### NOISE IN ADDITION TO NORMAL CLUTCH ENGAGEMENT

#### Noise in Addition to Normal Clutch Engagement

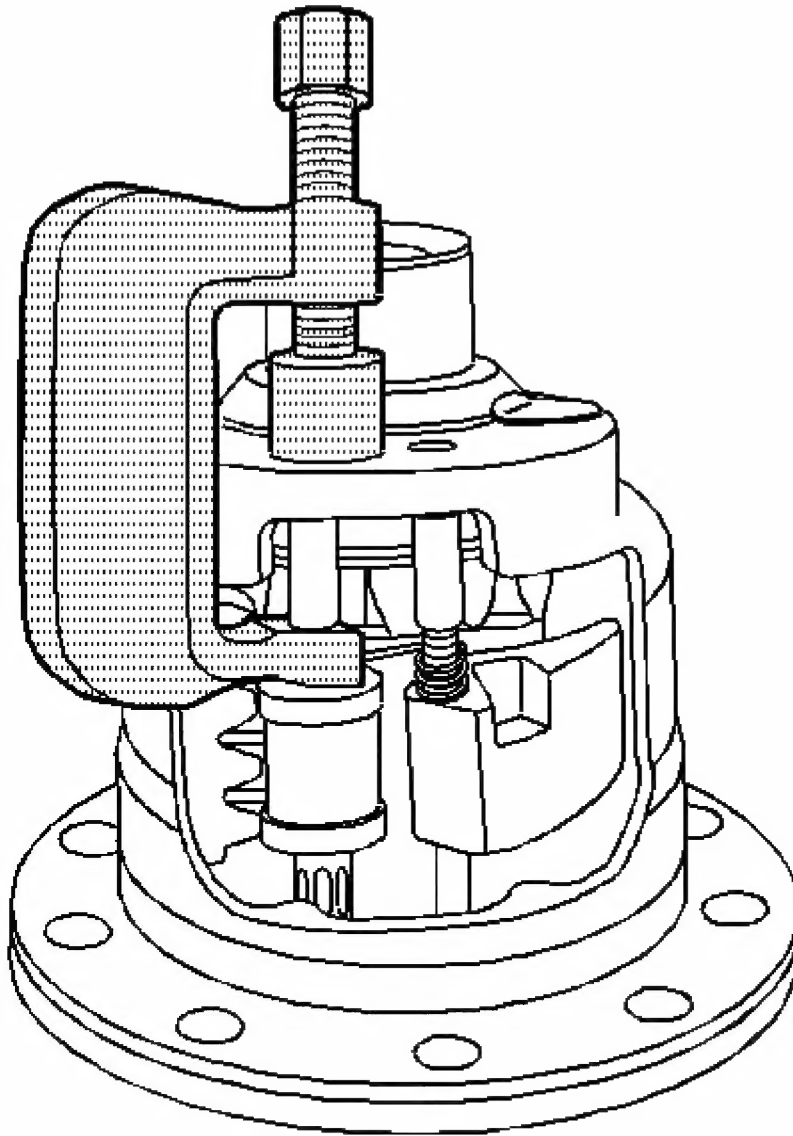
Checks	Action
The clutch plates are broken	Replace the clutch plates. Refer to the following: <ul style="list-style-type: none"><li>• <u>Locking Differential Disassemble</u></li><li>• <u>Locking Differential Cam Unit Disassemble</u></li><li>• <u>Locking Differential Cleaning and Inspection</u></li><li>• <u>Locking Differential Cam Unit Assemble</u></li><li>• <u>Locking Differential Adjustment</u></li><li>• <u>Locking Differential Assemble</u></li></ul>
The thrust block is broken	Replace the thrust block with a block of identical thickness. Check closely for other damage. Refer to <u>Locking Differential Disassemble</u> and <u>Locking Differential Assemble</u> .
The case is damaged	Replace the unit. Refer to <u>Differential Replacement</u> in Rear Drive Axle.
The differential gears are broken	Replace the gears. Refer to the following: <ul style="list-style-type: none"><li>• <u>Locking Differential Disassemble</u></li><li>• <u>Locking Differential Cam Unit Disassemble</u></li><li>• <u>Locking Differential Cleaning and Inspection</u></li><li>• <u>Locking Differential Cam Unit Assemble</u></li><li>• <u>Locking Differential Adjustment</u></li><li>• <u>Locking Differential Assemble</u></li></ul>

### REPAIR INSTRUCTIONS

#### LOCKING DIFFERENTIAL DISASSEMBLE

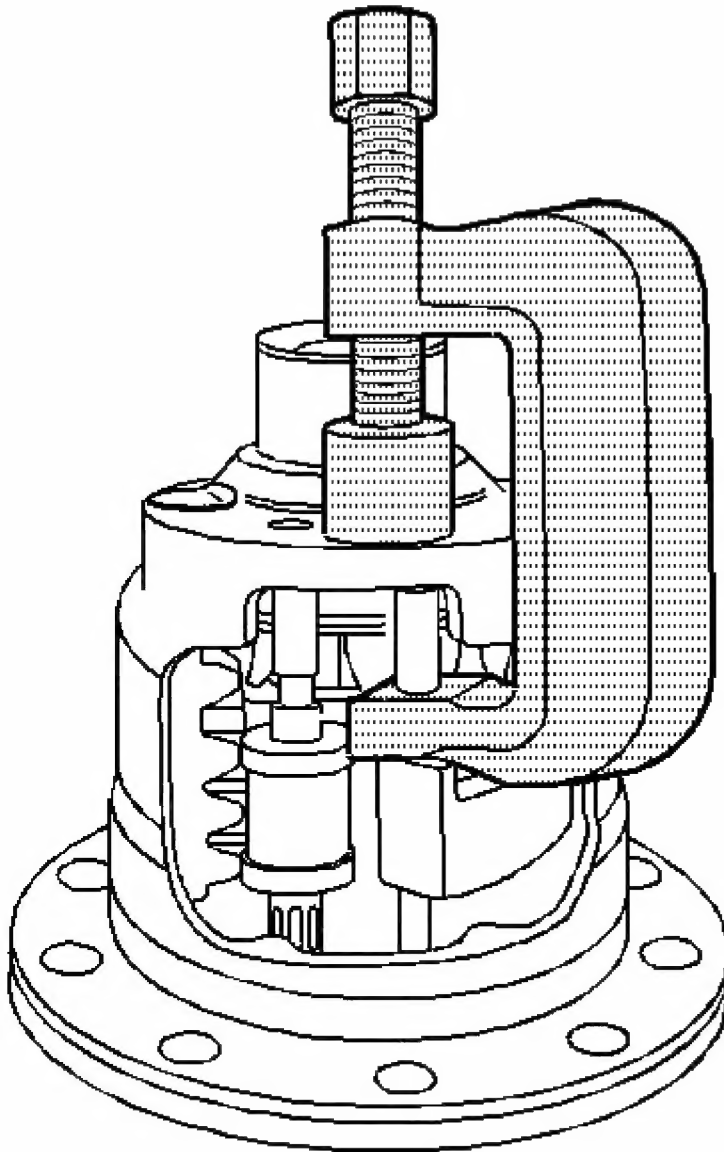
##### Tools Required

**J 26252** Locking Differential Governor Remover. See Special Tools and Equipment .



**Fig. 2: Locating Governor Bushing**  
**Courtesy of GENERAL MOTORS CORP.**

1. Remove the governor bushing using the **J 26252** .
2. Remove the E-clips that hold the latching bracket on the shaft. Move the bracket down the shaft.



**Fig. 3: Removing Latching Bracket Bushing**  
Courtesy of GENERAL MOTORS CORP.

3. Remove the latching bracket bushing using the **J 26252** .
4. Remove the latching bracket, the shaft, and the spring from the case.
5. Remove the governor assembly from the case.
6. Remove the pinion shaft lock bolt.
7. Remove the pinion shaft.



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8. Remove the differential pinion gear and pinion thrust washer.

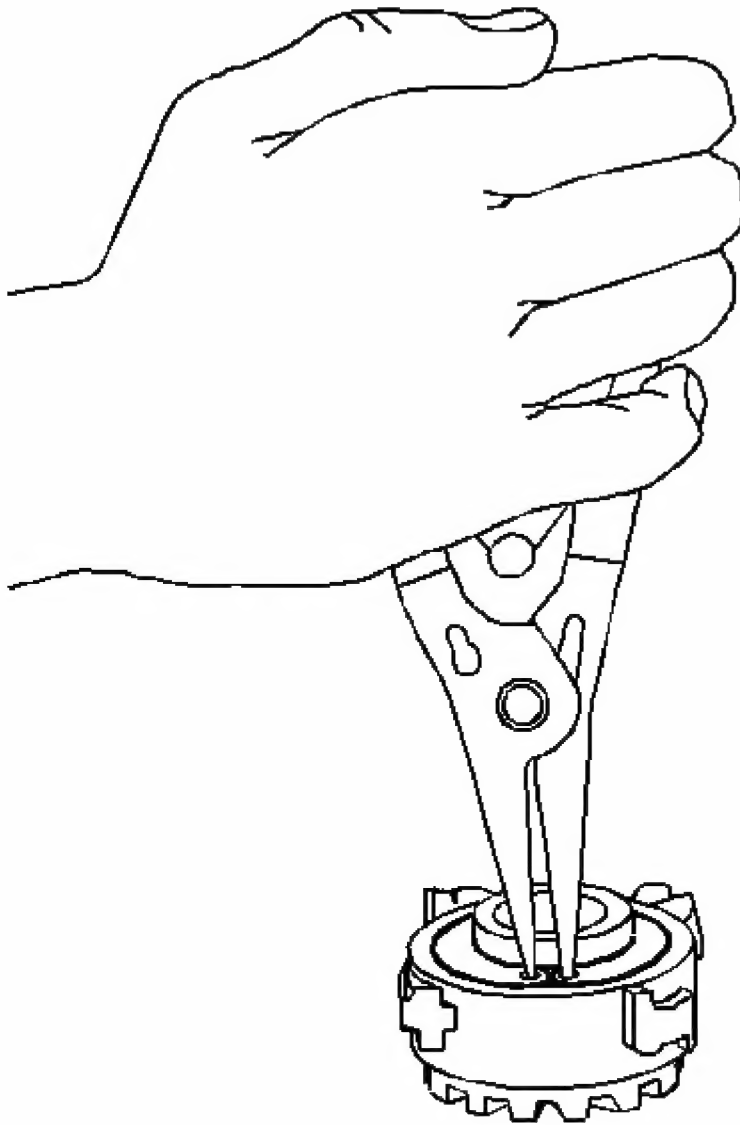
Rotate 1 of the side gears and roll the gears out of the case.

9. Remove the thrust block.
10. Remove the right side gear.
11. Remove the right clutch plates and the right side thrust washer.
12. Remove the left side gear, the cam plate, and the clutch plates as an assembly (cam unit).
13. Remove the left side gear thrust washer.

### **LOCKING DIFFERENTIAL CAM UNIT DISASSEMBLE**

1. Measure the length of the cam gear with the thrust washer installed. Measure the length from the edge of the gear tooth to the back side of the gear.

Record the measurement.



**Fig. 4: Removing Locking Differential Retaining Ring**  
**Courtesy of GENERAL MOTORS CORP.**

2. Remove the retaining ring using snap ring pliers.
3. Remove the clutch plates.
4. Remove the guide clips.
5. Remove the wave washer.
6. Remove the cam plate.
7. Remove the side cam gear.

## **LOCKING DIFFERENTIAL CLEANING AND INSPECTION**

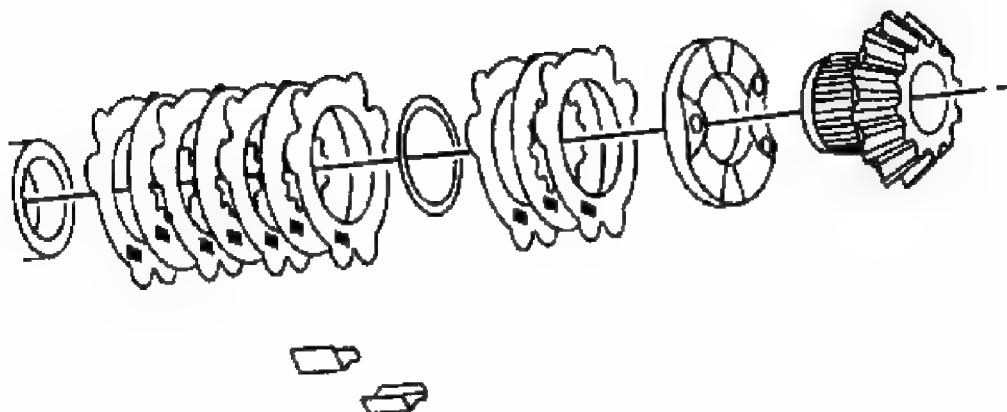
1. Clean all the parts with an approved solvent.
2. Visually inspect all the parts for excessive wear or breakage. Replace the parts if necessary.
3. Inspect the pinion gear and the side gear teeth for any the following conditions:
  - Wear
  - Cracks
  - Scoring
  - Spalling
4. Inspect the thrust washers for wear.
5. Inspect the fit of the side gears on the axle shafts.
6. Inspect the differential case for cracks and scoring.

**IMPORTANT: Do not replace the thrust sleeve unless it is necessary.**

7. Inspect the thrust sleeve for excessive wear.
8. Inspect the side gear bore for scoring. If scoring is present, replace the entire differential.
9. Replace the differential if you find any damage to the case.

## **LOCKING DIFFERENTIAL CAM UNIT ASSEMBLE**

1. Install the cam plate to the side cam gear.
2. Install the wave washer.



**Fig. 5: Installing Clutch Plates**  
Courtesy of GENERAL MOTORS CORP.

3. Install the clutch plates.

Alternate the plates as shown.

4. Install the thrust sleeve.

Press the thrust sleeve flush with the side gear disc splines.

5. Install the guide clips to the clutch plates.

- A. Use grease in the clips in order to hold the clips in place on the plates.
- B. If the side cam gear or the side thrust sleeve has been replaced, measure and record the overall length of the gear assembly from the front of the gear to the back of the side thrust sleeve, including the side gear thrust washer.
- C. Compare the reading with the reading obtained earlier in this section.
- D. If the new reading is more than 0.0762 mm (0.003 in) higher or lower than the original, select a thrust washer that will return the reading closest to the original reading.

## **LOCKING DIFFERENTIAL ADJUSTMENT**

### **Tools Required**

**J 7872** Magnetic Base Dial Indicator. See **Special Tools and Equipment** .

**Adjustment of the Differential**

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If it is necessary to replace the cam gear, the right hand side gear, or the thrust block, the entire differential must be adjusted. The differential is adjusted using selective thickness thrust washers behind each side gear, and the selective thickness thrust washers between the thrust blocks.

When adjusting the differential, note the following:

- Build up the differential properly.

The proper clearance between parts is critical to the operation of the unit.

- Adjust the backlash and thrust block clearance in the following order:
  1. The left side gear backlash
  2. The right side gear backlash
  3. The thrust block clearance

### Left Side Gear Backlash Adjustment

- Install the cam unit and the side thrust washer to the flange end of the differential case.
- Install the pinion gears and the side gear thrust washer into the differential case.

Align the openings of the pinion gears and the side thrust washer to the pinion shaft opening in the differential case.

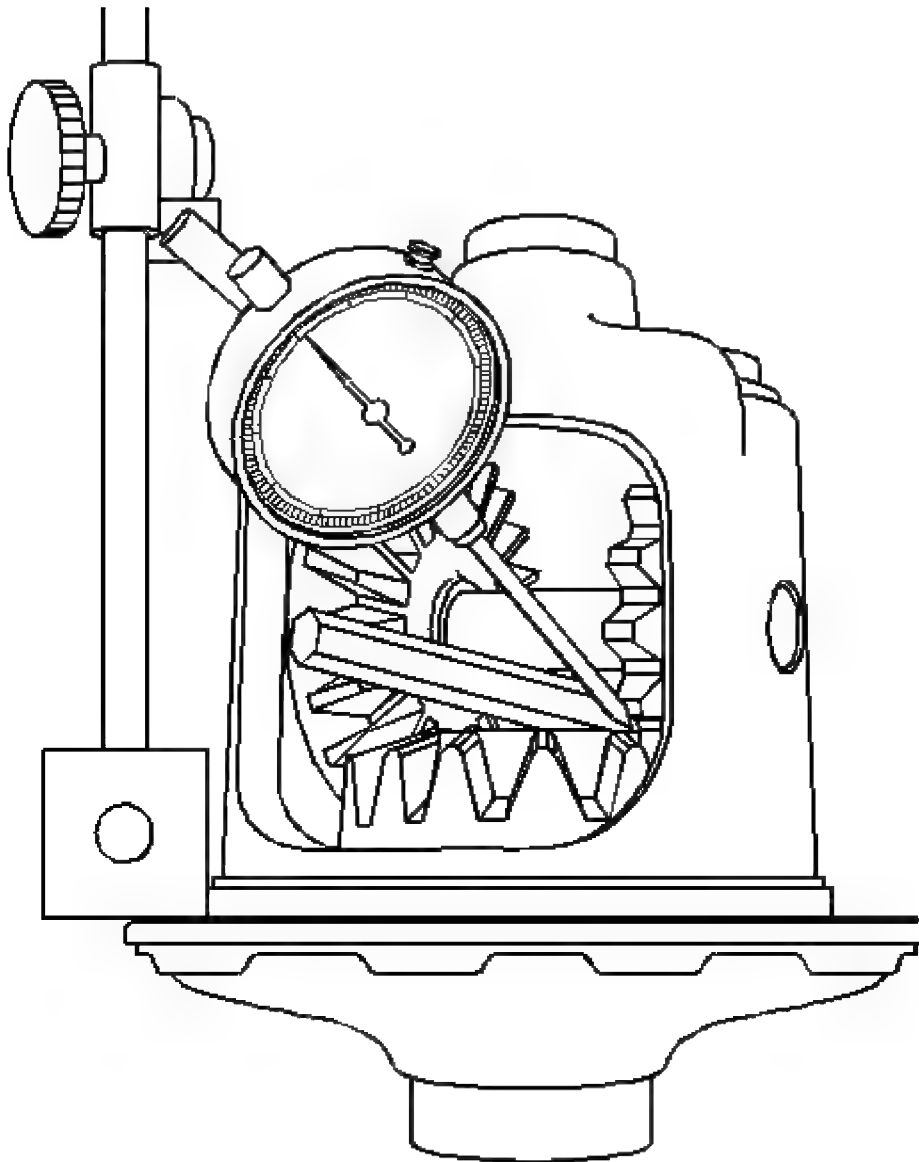
- Press down on the side gear and install the pinion shaft.

If the side gear cannot be pressed down far enough to install the pinion shaft, replace the side gear thrust washer with a thinner washer.

- Install the pinion shaft lock bolt.

Tighten the pinion shaft lock bolt finger tight.

- Rotate the pinion gear closest to the lock bolt so that one of the teeth is pointing downward (perpendicular to the ring gear flange).
- Insert a large tapered tool, such as a screwdriver, firmly between the side gear and the pinion shaft.



**Fig. 6: Measuring Backlash Of Pinion Gear & Side Gear**  
**Courtesy of GENERAL MOTORS CORP.**

- Measure the backlash of the pinion gear and the side gear by doing the following:
  1. Install the **J 7872** to the ring gear flange.
  2. Loosely clamp the **J 8001-3** onto the stem on the **J 7872** .
  3. Place the contact pad of the **J 8001-3** on one of the teeth of the pinion gear closest to the pinion shaft lock bolt.

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Turn the dial of the **J 8001-3** until the needle and the dial face indicate zero.

4. Tighten the lock nut of the **J 8001-2** finger tight.
5. Pull the pinion gear firmly into the differential case seat.
6. Rotate the pinion gear back and forth.
7. Measure the backlash.

Record the measurement.

8. Measure the backlash for the opposite pinion gear.
9. Add the measurements together.

**Specification:** The backlash for the pinion gears should be 0.051-0.243 mm (0.002-0.010 in).

10. If the backlash is too large, install a thicker side gear thrust washer and measure the backlash again.
11. If the backlash is too small, install a thinner side gear thrust washer and measure the backlash again.

### Right Side Gear Backlash Adjustment

1. Assemble the clutch plates.

Alternate the plates.

2. Assemble the guide clips to the plates.

Use grease in order to hold the clips in place on the plates.

3. Install the side gear thrust washer, the clutch plate assembly and the right side gear to the differential case.
4. Install the pinion gears and the side gear thrust washers into the differential case.

Align the openings of the pinion gears and the pinion gear thrust washers to the pinion shaft opening in the differential case.

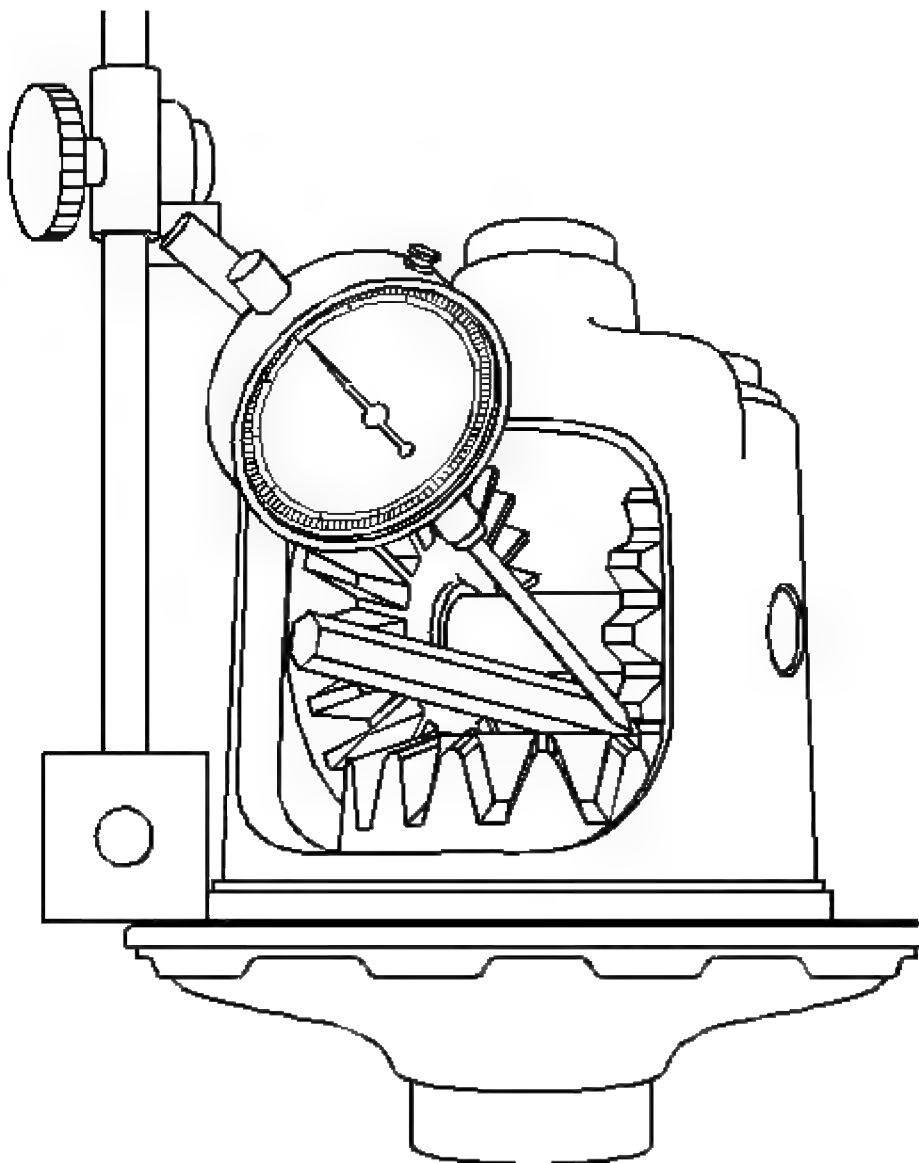
5. Press down on the side gear and install the pinion shaft.

If the side gear cannot be pressed down far enough to install the pinion shaft, replace the side gear thrust washer with a thinner washer.

6. Install the pinion shaft lock bolt.

Tighten the pinion shaft lock bolt finger tight.

7. Rotate the pinion gear closest to the lock bolt so that one of the teeth is pointing downward (perpendicular to the ring gear flange).
8. Insert a large tapered tool, such as a screwdriver, firmly between the side gear and the pinion shaft.



**Fig. 7: Measuring Backlash Of Pinion Gear & Side Gear**  
Courtesy of GENERAL MOTORS CORP.



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9. Measure the backlash of the pinion gear and the side gear by doing the following:
  - A. Install the **J 7872** to the ring gear flange.
  - B. Loosely clamp the **J 8001-3** onto the stem on the **J 7872**.
  - C. Place the contact pad of the **J 8001-3** on one of the teeth of the pinion gear closest to the pinon shaft lock bolt.

Turn the dial of the **J 8001-3** until the needle and the dial face indicate zero.

- D. Tighten the lock nut of the **J 8001-2** finger tight.
- E. Pull the pinion gear firmly into the differential case seat.
- F. Rotate the pinion gear back and forth.
- G. Measure the backlash.

Record the measurement.

- H. Measure the backlash for the opposite pinion gear.
- I. Add the measurements together.

**Specification:** The backlash for the pinion gears should be 0.051-0.243 mm (0.002-0.010 in).

10. If the backlash is too large, install a thicker side gear thrust washer and measure the backlash again.
11. If the backlash is too small, install a thinner side gear thrust washer and measure the backlash again.

### Thrust Block Clearance Adjustment

1. Install the left side gear thrust washer into the differential case.
2. Install the left side cam unit assembly into the differential case. Refer to **Locking Differential Cam Unit Assemble**.
3. Install the right side thrust washer into the differential case.
4. Assemble the right side clutch plates.

Alternate the clutch plates.

5. Assemble the guide clips to the plates.

Use grease in order to hold the clips in place on the plates.

6. Install the right side clutch plates into the differential case.
7. Install the right side gear into the differential case.

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8. Install the pinion shaft.
9. Install the pinion shaft bolt.

Tighten the pinion shaft bolt finger tight.

10. Insert a large tapered tool, such as a screwdriver, firmly between the side gears and the pinion shaft.

**IMPORTANT: Do not measure the distance between the side gear teeth.**

11. Measure the distance between the side gear faces using a 1-2 in telescoping gage.
12. Remove the telescoping gage.
13. Measure the telescoping gage with a micrometer.

Record the measurement.

14. Measure the original thrust block with a micrometer.

Record the measurement.

15. Subtract the thrust block measurement from the telescoping gage measurement.

**Specification:** The difference between the thrust block measurement and the telescoping gage measurement should be 0.000-0.1524 mm (0.000-0.006 in).

16. If the difference between the thrust block measurement and the telescoping gage measurement is greater than 0.1524 mm (0.006 in), reduce the distance by doing the following:
  - A. Select a new thrust block of the correct size in order to obtain the 0.000-0.1524 mm (0.000-0.006 in) clearance.
  - B. If a thrust block of the correct size is not available, increase or reduce the left and/or right thrust washers thickness in order to reduce the distance.

**IMPORTANT: The backlash must be rechecked and adjusted to specification anytime the left and/or the right thrust washers are replaced.**

- C. If the thrust washers were replaced, recheck the backlash.

### LOCKING DIFFERENTIAL ASSEMBLY

1. Install the left side gear thrust washer.

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2. Install the cam unit assembly. Refer to Locking Differential Cam Unit Assemble .
3. Install the right side gear thrust washer.
4. Install the right side clutch plates.
5. Install the right side gear.
6. Install the thrust block, the pinion thrust washer, and the pinion gear.

Place the pinion gears 180 degrees apart.

7. Rotate the gears and the thrust block into position.

The open side of the thrust block must face the window opening.

8. Install the pinion shaft.
9. Install the new pinion shaft lock bolt.

Tighten the pinion shaft lock bolt finger tight.

10. Install the governor assembly, and the latching bracket.

The straight end of the latching bracket spring must be over and outside the governor assembly shaft.

**IMPORTANT: Use only a bushing with a straight hole, not a tapered hole.**

11. Using a press, install the governor bushing.

**Specification:** Press the bushing into place until there is 0.102-0.508 mm (0.004-0.020 in) of shaft end play.

12. Using a press, install the latching bracket bushing.

Press the bushing in far enough to eliminate all end play.

## DESCRIPTION AND OPERATION

### LOCKING DIFFERENTIAL DESCRIPTION AND OPERATION

The locking differential consists of the following components:

- Differential case - 1 or 2 piece
- Locking differential spider - 2 piece case only
- Pinion gear shaft - 1 piece case only

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- Differential pinion gear shaft lock bolt - 1 piece case only
- 2 clutch discs sets
- Locking differential side gear
- Thrust block
- Locking differential clutch disc guides
- Differential side gear shim
- Locking differential clutch disc thrust washer
- Locking differential governor
- Latching bracket
- Cam plate assembly
- Differential pinion gears
- Differential pinion gear thrust washers

The optional locking differential (RPO G80) enhances the traction capability of the rear axle by combining the characteristics of a limited-slip differential and the ability of the axle shafts to "lock" together when uneven traction surfaces exist. The differential accomplishes this in 2 ways. First by having a series of clutch plates at each side of the differential case to limit the amount of slippage between each wheel. Second, by using a mechanical locking mechanism to stop the rotation of the right differential side gear, or the left differential side gear on the 10.5 inch axle, in order to transfer the rotating torque of the wheel without traction to the wheel with traction. Each of these functions occur under different conditions.

### Limited-Slip Function

Under normal conditions, when the differential is not locked, a small amount of limited-slip action occurs. The gear separating force developed in the right-hand (left-hand side on 10.5 inch axle) clutch pack is primarily responsible for this.

The operation of how the limited-slip function of the unit works can be explained when the vehicle makes a right-hand turn. Since the left wheel travels farther than the right wheel, it must rotate faster than the ring gear and differential case assembly. This results in the left axle and left side gear rotating faster than the differential case. The faster rotation of the left-side gear causes the pinion gears to rotate on the pinion shaft. This causes the right-side gear to rotate slower than the differential case.

Although the side gear spreading force produced by the pinion gears compresses the clutch packs, primarily the right side, the friction between the tires and the road surface is sufficient to overcome the friction of the clutch packs. This prevents the side gears from being held to the differential case.

### Locking Function

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Locking action occurs through the use of some special parts:

- A governor mechanism with 2 flyweights
- A latching bracket
- The left side cam plate and cam side gear

When the wheel-to-wheel speed difference is 100 RPM or more, the flyweights of the governor will fling out and one of them will contact an edge of the latching bracket. This happens because the left cam side gear and cam plate are rotating at a speed different, either slower or faster, than that of the ring gear and differential case assembly. The cam plate has teeth on its outer diameter surface in mesh with teeth on the shaft of the governor.

As the side gear rotates at a speed different than that of the differential case, the shaft of the governor rotates with enough speed to force the flyweights outward against spring tension. One of the flyweights catches its edge on the closest edge of the latching bracket, which is stationary in the differential case. This latching process triggers a chain of events.

When the governor latches, it stops rotating. A small friction clutch inside the governor allows rotation, with resistance, of the governor shaft while one flyweight is held to the differential case through the latching bracket. The purpose of the governor's latching action is to slow the rotation of the cam plate as compared to the cam side gear. This will cause the cam plate to move out of its detent position.

The cam plate normally is held in its detent position by a small wave spring and detent humps resting in matching notches of the cam side gear. At this point, the ramps of the cam plate ride up on the ramps of the cam side gear, and the cam plate compresses the left clutch pack with a self-energizing action.

As the left clutch pack is compressed, it pushes the cam plate and cam side gear slightly toward the right side of the differential case. This movement of the cam side gear pushes the thrust block which compresses the right-hand side gear clutch pack.

At this point, the force of the self-energizing clutches and the side gear separating force combine to hold the side gears to the differential case in the locking stage.

The entire locking process occurs in less than 1 second. The process works with either the left or right wheel spinning, due to the design of the governor and cam mechanism. A torque reversal of any kind will unlatch the governor, causing the cam plate to ride back down to its detent position. Cornering or deceleration during a transmission shift will cause a torque reversal of this type. The differential unit returns to its limited-slip function.

The self-energizing process would not occur if it were not for the action of one of the left clutch discs. This energizing disc provides the holding force of the ramping action to occur. It is the only disc which is splined to the cam plate itself. The other splined discs fit on the

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cam side gear.

If the rotating speed of the ring gear and differential case assembly is high enough, the latching bracket will pivot due to centrifugal force. This will move the flyweights so that no locking is permitted. During vehicle driving, this happens at approximately 32 km/h (20 mph) and continues at faster speeds.

When comparing the effectiveness of the locking differential, in terms of percent-of-grade capability to open and limited-slip units, the locking differential has nearly 3 times the potential of the limited-slip unit under the same conditions.

### Locking Differential Torque-Limiting Disc

The locking differential design was modified in mid-1986 to include a load-limiting feature to reduce the chance of breaking an axle shaft under abusive driving conditions. The number of tangs on the energizing disc in the left-hand clutch pack was reduced allowing these tangs to shear in the event of a high-torque engagement of the differential locking mechanism.

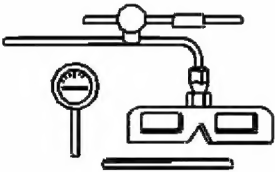
At the time of failure of the load-limiting disc, there will be a loud bang in the rear axle and the differential will operate as a standard differential with some limited-slip action of the clutch packs at low torques.

The service procedure, when the disc tangs shear, involves replacing the left-hand clutch plates and the wave spring. It is also necessary to examine the axle shafts for twisting because at high torques it is possible to not only shear the load-limiting disc, but to also twist the axle shafts.

## SPECIAL TOOLS AND EQUIPMENT

### SPECIAL TOOLS

#### Special Tools

Illustration	Tool Number/Description
	J 7872 Magnetic Base Dial Indicator
	J 26252-A Locking Differential Governor Remover

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